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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/573,671

03/24/2006

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124-1154

5058

23117 7590 04/29/2010  
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EXAMINER

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ART UNIT

PAPER NUMBER

2874

MAIL DATE

DELIVERY MODE

04/29/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/573,671  
Filing Date: March 24, 2006  
Appellant(s): HILL ET AL.

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Stanley C. Spooner  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 11/5/09 appealing from the Office action mailed 5/15/09.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

No amendment after final has been filed.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

**NEW GROUND(S) OF REJECTION**

Claims 1-10, 15 and 16 stand rejected under 35 USC §102(e) as being anticipated by Knudsen (U.S. Patent 6,575,033) with inherency explained by Isao et al (JP 2003-254724, supplied by applicant after filing of appeal brief).

Claims 11 & 12 stand rejected under 35 USC §103(a) as being obvious over Knudsen and Isao in view of Cranch et al ("Large-Scale Multiplexing of Interferometric Fiber-Optic Sensors Using TDM and DWDM," Journal of Lightwave Technology, Vol. 19, No. 5, May 2001, pp687-699).

Claims 13 & 14 stand rejected under 35 USC § 103(a) as being obvious over Knudsen and Isao in view of Kleinerman (U.S. Patent 5,991,479).

The new ground of rejection is a re-interpretation of the Knudsen reference with supporting evidence.

#### **(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

#### **(8) Evidence Relied Upon**

6,575,033	Knudsen et al.	6-2003
JP 2003-254724	Isao et al.	10-2003
5,991,479	Kleinerman	11-1999

Cranch et al. "Large-Scale Multiplexing of Interferometric Fiber-Optic Sensors Using TDM and DWDM" Journal of Lightwave Technology, Vol. 19, No. 5 (May 2001), pp687-699.

#### **(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

**Claims 1-10, 15, and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Knudsen et al (USPAT 6,575,033) with inherency explained by Isao et al (JP 2003-254724, supplied by applicant after filing of appeal brief).**

Knudsen discloses a fibre optic sensor array comprising accelerometers (22, 23, 24, 25) which are read on the claimed at least two fibre optic point sensors. This is a reasonable interpretation as Appellant discloses point sensors are 100 meters of wound optical fiber, and it is also to measure acceleration (see Appellant's specification page 6, lines 2-3, 15-17). Knudsen discloses in fig. 5 and 6 that the accelerometers comprise windings of optical wire (column 9, lines 19-20). Knudsen further discloses the accelerometers are interconnected with a transmission cable including an optical fiber (col. 5, lines 18-20, col. 6, lines 1-3). This optical fiber is distributed as it runs the length between the accelerometers. The optical fiber between the accelerometers is read on the distributed fibre-optic sensors. The Knudsen sensor array will provide an output

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including signal variations due to the changes in the optical fiber characteristics which is read on outputting of sensed data.

Knudsen does not state that the transmission cable fiber acts as a distributed sensor. The optical fiber of the transmission cable will inherently act as a sensor because it will experience variations due to the compression waves from the blast (i.e., the motion of the earth as shown in fig. 2 and column 6, lines 39-41) in a similar manner as the fibers in the accelerometers; however, due to the lack of numerous windings the sensing of these compression waves will be of a much lower level. Isao provides evidence of this fact by disclosing interconnecting fibers (2) act as low sensitivity sensors in comparison to high sensitivity strain gages (21, 22, 23, ..., these are read on appellant's claimed fibre-optic point sensors), see abstract and paragraph 8.

Re claims 2-4, Knudsen teaches at column 5, lines 10-27 that the structure 10 may be interrogated. A signal converter 40 and signal processing equipment 35 are utilized. In fig. 2, the sensor array is connected to a cable string 28 to the signal converter 40 and signal processing equipment 35. A transducer (abstract, column 2, line 51) and a wire cable (electrical strain gauge can be utilized, see column 16, line 51) are also utilized.

In re claim 5, fig. 5 and 6 shows that the optical fiber wound into a flexural disc.

In re claims 6 and 7, Knudsen shows at column 3, line 52-55 that the fiber optic point sensors are for measuring seismic data (geophone), and accelerometer.

In re claim 8, as discussed above in detail, the interconnecting optical fiber is functioning as a low sensitivity sensor, and sensing the strain (pressure) and bend of the cable will be of a much lower level.

In re claim 9, Knudsen shows in abstract that interferometric system is utilized.

In re claim 10, Knudsen shows at column 15, lines 52-65 that Michaelson Interferometer (reflectometric interferometer) can be utilized.

In re claims 15 and 16, Knudsen shows all the claimed structural limitations, and the claimed method steps are inherently done by the Knudsen device for the purpose of measuring and analyzing the optical signal.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knudsen et al and Isao in view of Cranch et al ("Large-Scale Multiplexing of Interferometric Fiber-Optic Sensors Using TDM and DWDM," Journal of Lightwave Technology, Vol. 19, No. 5, May 2001, pp687-699).**

Knudsen and Isao disclose every aspect of claimed invention except for the pulsed reflectometric interferometric interrogation system (claim 11) employing time-division multiplexing (claim 12).

Cranch show a general teaching of utilizing the pulsed reflectometric interferometric system employing time-division multiplexing for the purpose of distinguishing individual sensor signals in the multiplexed array (see page 687, right column, line 1-2).

Therefore, it would have been obvious to the person having ordinary skill in the art at the time the invention was made to modify the Knudsen's or Isao's devices to include the pulsed reflectometric interferometer as shown in Cranch for the purpose of determining individual sensor signals in a multiplexed array.

**Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knudsen et al and Isao in view of Kleinerman (USPAT 5,991,479).**

Knudsen and Isao disclose every aspect of claimed invention except for the pulsed Rayleigh-backscatter interrogation system.

Kleinerman shows the general teaching of utilizing the pulsed Rayleigh-backscatter interrogation system.

It would have been obvious to the person having ordinary skill in the art at the time the invention was made to modify the Knudsen's and Isao's devices to include the pulsed Rayleigh-backscatter interrogation system as shown in Kleinerman for the purpose of measurement of temperature and/or forces distributed over many locations, simultaneously and with a single fiber probe (see column 5, lines 1-9). It is clear that this would improve the device.

#### **(10) Response to Argument**

Point A, it is agreed that point and distributed sensors are different devices as discussed in the text excerpted from Grattan.

Point B, the argument stating Knudsen does not disclose point and distributed sensors is disagreed with. Knudsen discloses accelerometers which are point sensors, and Knudsen discloses optic interconnecting fibers which act as distributed sensors. Contrary to appellant's assertion that the interconnecting fibers do not act as sensors, it is inherent in the properties of a fiber that compression will change the optical index. Evidence of this inherency is disclosed in Isao which shows two types of sensors and the distributed type is an optic fiber that interconnects point type sensors.

Point C, Appellant argues Knudsen fails to disclose every feature. As discussed above all features are disclosed. Further Appellant argues the point sensors are not

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interconnected as claimed, however there is an optical fiber interconnecting each of the accelerometers and as discussed above this fiber is read on the distributed sensor.

Points D, E and F, the arguments that neither of Cranch nor Kleinerman remedy deficiencies of Knudsen is not persuasive as it has been demonstrated Knudsen is not deficient.

Point G, the argument that Examiner has not provided anything more than the general conclusion that the combination provides a beneficial result and therefore this is a motivation to combine is not persuasive. The examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Kleinerman teaches that the device is beneficial for measurement of temperature and/or forces distributed over many locations, simultaneously and with a single fiber probe (see column 5, lines 1-9); and Cranch teaches that the device is beneficial for efficient multiplexing by individual sensor signals to be distinguished in the multiplexed array (see page 687, right column, lines 1-2).

Point H, the argument that Knudsen teaches away from use of distributed sensors is not persuasive because Knudsen's interconnecting fibers are in fact distributed sensors.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

This examiner's answer contains a new ground of rejection set forth in section **(9)** above. Accordingly, appellant must within **TWO MONTHS** from the date of this answer exercise one of the following two options to avoid *sua sponte* **dismissal of the appeal** as to the claims subject to the new ground of rejection:

**(1) Reopen prosecution.** Request that prosecution be reopened before the primary examiner by filing a reply under 37 CFR 1.111 with or without amendment, affidavit or other evidence. Any amendment, affidavit or other evidence must be relevant to the new grounds of rejection. A request that complies with 37 CFR 41.39(b)(1) will be entered and considered. Any request that prosecution be reopened will be treated as a request to withdraw the appeal.

**(2) Maintain appeal.** Request that the appeal be maintained by filing a reply brief as set forth in 37 CFR 41.41. Such a reply brief must address each new ground of rejection as set forth in 37 CFR 41.37(c)(1)(vii) and should be in compliance with the other requirements of 37 CFR 41.37(c). If a reply brief filed pursuant to 37 CFR 41.39(b)(2) is accompanied by any amendment, affidavit or other evidence, it shall be treated as a request that prosecution be reopened before the primary examiner under 37 CFR 41.39(b)(1).

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Extensions of time under 37 CFR 1.136(a) are not applicable to the TWO MONTH time period set forth above. See 37 CFR 1.136(b) for extensions of time to reply for patent applications and 37 CFR 1.550(c) for extensions of time to reply for ex parte reexamination proceedings.

Respectfully submitted,

/Ellen Kim/

Primary Examiner, Art Unit 2874

**A Technology Center Director or designee must personally approve the new ground(s) of rejection set forth in section (9) above by signing below:**

New Grounds - APPROVED

/Richard K Seidel/

Director, Technology Center 2800

Conferees:

/Brian Sircus/  
TQAS, TC 2800

/UYEN-CHAU N. LE/  
Supervisory Patent Examiner, Art Unit 2874